| Notice of Allowability | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/050,462 | SCHAFFNER, TERRY MICHAEL | |
| | Examiner | Art Unit | |
| | Inder P. Mehra | 2617 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment dated: 9/6/2006*.

2. ☒ The allowed claim(s) is/are *20-34, 36, 35, 37-55 (Renumbered as 1-36 respectively)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 1/15/2002
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *9/25/06* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

JOHN PEZZLO
PRIMARY EXAMINER

## DETAILED ACTION

1. This office action is in response to amendment dated: 5/06/06. Based on this amendment, claims 1, 9, 14, 17, and 20-55 are pending. Out of these pending claims, claims 1, 9, 14, and 17 are cancelled per examiner's amendment, as follows, and therefore, claims 20-55 are pending.

## EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment, without prejudice, was given in a telephone interview (Telephone 408-253-3860) with Alan Heimlich, Attorney, Reg. No. 488808 on 9/14/06.The application has been amended as follows:

Claims 1, 9, 14 and 17 have been cancelled.

### *Allowable Subject Matter*

3. Claims 20-55 are allowed.

## REASONS FOR ALLOWANCE

4. The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose, teach or suggest directly, or indirectly the following limitations in combinations with other limitations of the claims, as follows:

**As recited by claim 20,**

(b) processing the received signal to reduce the frequency offset of the received signal based upon a frequency offset estimate;

(c) despreading the processed received signal with a first despreading sequence to

create a first despread signal;

(d) despreading the first despread signal with a second despreading sequence to create a second despread signal;

(e) estimating the frequency offset of the second despread signal to create a frequency offset estimate;

(f) despreading the second despread signal at a first time offset to create a third despread signal;

(g) despreading the second despread signal at a second time offset to create a fourth despread signal; and

(h) comparing the energy of the third and fourth despread signals to determine a second despreading sequence.

**As recited by claim 20,**

(a) acquiring chip synchronization to a signal spread with a code sequence of length

K, where K=2m;

(b) setting an initial detection period of x=x0 chips;

(c) detecting a partial code symbol of length x chips; and

(d) if x=K, declaring symbol synchronization, else setting x=x*2 and repeating (c) and (d).

**As recited by claim 30,**

(a) acquiring chip synchronization to a signal spread with a code sequence of length K, where K=2m;

(b) setting an initial detection period of x=x0 chips;

(c) detecting a partial code symbol of length x chips; and

(d) if x=K, declaring symbol synchronization, else setting x=x*2 and repeating (c) and (d).

**As recited by claim 37,**

(c) correlating the received data sequence with a locally stored replica of the transmit PN sequence (of length M) to acquire an initial PN sequence alignment with the received data sequence at a PN sequence timing rate;

(d) estimating a frequency offset between the transmit frequency and the local oscillator frequency, based on a phase difference between the first half of the PN sequence correlation and the second half of the PN sequence correlation and adjusting the local oscillator frequency to make the offset smaller;

(e) setting a variable X=I ;

(f) correlating a newly received data sequence with the PN sequence and a Walsh code of length 2x;

(g) picking the highest correlation energy in (f) as a new Walsh boundary;

(h) despreading the newly received data sequence with the Walsh code of length 2x using the PN sequence timing rate over the new Walsh boundary;

(i) estimating a new frequency offset based on a phase difference between the first half of a PN-Walsh sequence correlation and a second half of the PN-Walsh sequence correlation over a length of M*2Xand adjusting the local oscillator frequency to make the offset smaller;

(j) determining if2X=N and if so outputting a signal indicating symbol synchronization in the receiver, else setting X=X+I and going to (f).

**As recited by claim 40,**

(b) calculating a frequency offset between the transmitted signal frequency and a local oscillator frequency by calculating a phase estimate between a signal X0(t) and Xl(t) where:

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and,

k=M/2, M, 2M ..... (N/2)M

(c) adjusting the local oscillator frequency to provide lower offset

(d) despreading the received data signal;

(e) calculating two decision metrics Z0 and Z1, where:

Y(t) = Xo(t) + Xl(t)

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(f) choosing the higher of Zo or Z1 to determine a symbol synchronization; and

(g) repeating (b) through (f) for k=M/2, M, 2M, ..., (N/2)M.

**As recited by claim 43,**

a first multiplier having a first input, a second input, and an output, the first input coupled to receive the signal;

a second multiplier having a first input, a second input, and an output, the first input coupled to receive the first multiplier output, the second input coupled to receive a PN sequence;

a third multiplier having a first input, a second input, and an output, the first input coupled to receive the second multiplier output,

a first accumulator having an input and an output, the input coupled to receive the third multiplier output;

a frequency offset estimator having an input and an output, the input coupled to, receive the first accumulator output;

a frequency generator having an input and an output, the input coupled to receive the frequency offset estimator output, the output coupled to the first multiplier second input;

a second accumulator having an input and an output, the input coupled to receive the first accumulator output;

a Z-transform block having an input and an output, the input coupled to receive the second accumulator output;

an adder having a positive input, a negative input, and an output, the negative input coupled to receive the Z-transform block output, the positive input coupled to receive the second accumulator output;

a power computation block having an input and an output, the input coupled to receive the adder output;

a third accumulator having an input and an output, and the input coupled to receive the power computation output;

a fourth accumulator having an input and an output, and the input coupled to receive the power computation output;

a threshold block having a first input, a second input, and an output, the first input coupled to receive the third accumulator output, the second input coupled to receive the fourth accumulator output;

a symbol timing adjustment block having an input and an output, the input coupled to receive the threshold block output;

a Walsh sequence code generator having an input and an output, the input coupled to receive the output of the symbol timing generator, the output coupled to the second input of the third multiplier; and

a symbol detector output signal coupled to receive the first accumulator output.

**As recited by claim 46,**

means for multiplying the signal and a substantially sinusoidal signal at a frequency;

means for despreading the signal with a PN sequence creating a PN-despread

signal;

means for despreading the PN-despread signal with a Walsh sequence creating a PW-output;

means for accumulating the PW-output creating Walsh chip sums;

means for frequency offset estimation;

means for generating the frequency;

means for accumulating the Walsh chip sums;

means for performing a Z transform;

means for computing power;

means for accumulating alternating Walsh chip sums;

means for threshold comparison; and

means for adjusting Walsh symbol timing.

**As recited by claim 51,**

multiplies the signal and a substantially sinusoidal signal at a frequency;

despreads the signal with a PN sequence creating a PN-despread signal;

despreads the PN'-despread signal with a Walsh sequence creating a PW-output;

accumulates the PW-output creating Walsh chip sums;

estimates frequency offset;

generates the frequency;

accumulates the Walsh chip sums;

performs a Z transform;

computes power;

accumulates alternating Walsh chip sums;

performs threshold comparison; and

adjusts Walsh symbol timing.

**As recited by claim 54,**

(d) estimating a frequency offset between the transmit frequency and the local oscillator frequency, based on a phase difference between the first half of the PN sequence correlation and the second half of the PN sequence correlation and adjusting the local oscillator frequency to make the offset smaller;

(e) setting a variable X=I ;

(f) correlating a newly received data sequence with the PN sequence and a Walsh code of length 2x;

(g) picking the highest correlation energy in (f) as a new Walsh boundary;

(h) despreading the newly received data sequence with the Walsh code of length 2x using the PN sequence timing rate over the new Walsh boundary;

(i) estimating a new frequency offset based on a phase difference beb,veen the first half ofa PN-Walsh sequence correlation and a second half of the PN-Walsh sequence correlation over a length of M*2x and adjusting the local oscillator frequency to make the offset smaller;

(j) determining if 2X=N and if so outputting a signal indicating symbol synchronization in the receiver, else setting X=X+I and going to (f).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Inder P. Mehra whose telephone number is 571-272-3170. The examiner can normally be reached on Monday through Friday from 8AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on 571-272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Inder Pal Mehra 9/25/06
Inder P Mehra
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JOHN PEZZLO
PRIMARY EXAMINER